## LEYPUNSKIY, A. I. et al

"Experimental studies of fast neutron reactor physics."

report presented at the 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.

KOSHKIN, Yu. N.; LEYPUNSKIY, A. I.

"Sodium cooled fast reactors."

report submitted for 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.

ACCESSION NR: AP4049534

S/0089/64/017/005/0345/0348

AUTHORS: Leypunskiy, A. I.; Kazachkovskiy, O. D.; Afrikantov, I. I.; rinkhasik, M. S.; Krasnoyarov, N. V.; Poydo, M. S.

TITLE: Sodium cooled fast reactors

SOURCE: Atomnaya energiya, v. 17, no. 5, 1964, 345-348

TOPIC TAGS: power reactor, i quid metal cooled reactor, fast reactor/BN-350

ABSTRACT: The first fast-neutron power reactor now being designed in the SSSR (BN-350) is described. It is rated 1000 MW thermal and 350 MW electrical. Sodium coolant at 300C (total volume 165 m $^3$ ) is heated in the reactor to 500C by about 200 fuel elements. The volume of the active zone ( $\sim$ 2000 liters) and the power ratio (500 kW/liter) ensure a minimum use of fuel in the cycle. The ratio of the diameter of the active zone to its height (D/H) is 1.4 (D = 1.5

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m, H = 1.06 m), the maximum sodium speed is 10 m/sec, the thickness of the breeder zones on the periphery and on the end is 60 cm. construction permits the active zone size to be varied and to use different types of fuel elements. A ceramic fuel element is used consisting of a mixture of plutonium dioxide (19% Pu) and  $U^{238}$ . Enriched (23%) uranium dioxide can also be used. The fuel rod is a stainless steel tube 5 mm in diameter and 0.4 mm thick, filled with pellets of the sintered fuel. The arrangement of the active and breeder zones is such as to produce a conversion ratio ~1.5. The internal conversion ratio is 0.62. The change in reactivity is 0.6% per month and is compensated by motion of central ruel elements with a reactivity margin of 1.4%, permitting 2 months' continuous operation. The shielding, control, and safety precautions are described. The sodium flows through a heat exchanger in which steam is produced at 430C and 50 atm pressure. Some improvements are suggested for future designs on the basis of the experience already gained in the design of the BN-350. Orig. art. has: 1 figure.

L 20049-65 ACCESSION NR: AP4049534 ASSOCIATION: None ENCL: 00 SUBMITTED: 00 OTHER: 000 NR REF SOV: 002 SUB CODE: NP 3/3 Card

#### "APPROVED FOR RELEASE: Monday, July 31, 2000

CIA-RDP86-00513R000929720

SWT(m)/EWA(h) Peb DIAAP BOOK EXPLOITATION ACCESSION NR AM5007588 .0.5.R. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii SSSR Calleton of the Information Center on Nuclear Data, no. 1 (B yulleten' Informater mago tsentra po yadernym dannym, vyp. 1), Ed. by A. I. Leypunokiy and June : Nomizdat, 10%, 431 p. illus., biblio., taples. Errata printed on last page. 350 copies printed. TOPIC TAGS: neutron interaction, nuclear reactor, radiation shielding, neutron cross section, neutron diffraction TABLE OF CONTENTS [abridged]: Foreword -- 3 Part 1. Parameters of elementary interactions of neutrons with nuclei -- 6 Fart 2. Reactor constants -- 284 Part 3. Methodological problems - 402 SUB CODE: NP SUBMITTED: 000006h OTHER: OOL NO REF SOV: 009 Card 1/1 1/2

Card 1/4

09010419

L 5171-66 EPA(s)-2/EMT(m)/SPF(c)/SPF(n)-2/EMG(m)/T/EMP(t)/EMF(b) ACCESSION NR: AT5022451 JD/MV/JG/GS UR/0000/65/000/000/0001/0030 AUTHOR: Leypunskiy, A. I.; Kazachkovskiy, O. D.; Pinkhasik, M. S.; Krasnoyarov, N. V.; Bagdasarov, Yu. Ye.; Troyanov, M. F.; Milovidov, I. V.; Afrikantov, I. I.; Poydo, M. S. (Deceased); Stekol'nikov, V.V. TITLE: BN-350 nuclear power plant SOURCE: Obninsk. Fiziko-energeticheskiy institut. Doklady, 1965. Atomnaya stantsiya BN-350, 1-30 TOPIC TAGS: nuclear power plant, liquid metal cooled reactor, fast reactor, nuclear reactor technology, desalination ABSTRACT: After a brief discussion of the advantages of using fast neutron reactors for power production, a new 350 Mw fast neutron sodium cooled reactor of BN-350 type is described. At present, a power plant equipped with such reactors and P-50 back pressure steam turbines is under construction in the Mangyshlak peninsula area at the northeastern coast of the Caspian Sea. The dual-purpose plant will generate 150 Mw of electric power and produce 1200 ton/hr of

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steam. The steam will be used by a desalting plant designed supply 120,000 cu m of fresh water per day. It is expected to and the secondary intermediate loops of the reactor will be of steam-water type. It is expected to and the secondary intermediate loops of the reactor will be of reactor core carries 211 sexagonal fuel assemblies each contain uranium-dioxide elements. At the beginning, a compound of are 120 inner and 320 outer assemblies placed in fuel elements. The selected essential data on BN-350 reactor are as follows:  Thermal power  Core Volume  Core diameter  Core diameter  Core height  Vessel diameter  Coolant temperature (inlet)  Coad 2/4  Card 2/4	hat the primary coled by The ining

L 5171-66

ACCESSION NR: AT5022451

Many other details and data are given on reactor core and concrete shielding as well as on the reactor tank made of X18119 stainless steel. A special chapter is devoted to the discussions of various control systems including power control, measurements, automatic regulation, reactivity compensation, and emergency protection. The replacement and handling of fuel elements is also discussed. The radiation shielding is briefly described. Some information is given on the selection of materials as well as on the experimental investigation of various control and safety systems. An extensive analysis of heat transfer system is also presented dealing with primary and secondary loops, heat exchanger, pumps, piping, emergency heat removal, steam generators and other equipment. In conclusion, some further possible improvements in the design and operation of fast neutron reactors are outlined including a more efficient burn-up of

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ACCESSION NR: AT5022451

fuel elements, a further increase in temperature and an eventual use of fuel carbides instead of oxides. Orig. art. has: 2 tables and
ASSOCIATION: none

SUBMITTED: 02Mar65 ENGL: 00 SUB CODE: EE, NP
NO REF SOV: 000 OTHER: 000

UR/0089/65/018/004/0342/0350 🚙 ACLESSION NR: AP5012468 100 - 15: Leypunskiy, A. I.; Kazachkovski, D.: Shikhov, S. B.: , TIT : Study of the possibility of using thorium in fast power SG: T: Atomnaya energiya, v. 18, no. 4, 1965, 342-350 TOP: TAGS: fast reactor, breeder reactor, plutonium reactor, thor, a reactor, nuclear fuel, fuel burnup ABSTRACT: In view of the difficulties involved in large-scale economic use of U<sup>233</sup> and thorium for nuclear power generation, the archers consider the use of these materials in conjunction with the where the second Pu  $^{239}$  -  $^{11}$  -  $^{239}$  compared to a linear show that the use of a compared to  $^{239}$  -  $^{239}$  -  $^{239}$  -  $^{239}$ smille to reprove markedly the characteristics of thorium-fuel fast Cara 1/3

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ACCESSION NR: AP5012468

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reactors and to obtain a system with a fuel-doubling time which differs little from that of a pure plutonium reactor and is much shorter than that for uranium and thorium alone. In such a system the thorium is placed in the least and the 1231, U238, and Pu239 are placed in the least in the 1231, U238, and Pu239 are placed in the least in the 1231 and Pu239 are something of U233 and Pu239 are something the restriction remains constant. The characteristics are compared for both while a locatellic fuel, using a liquid-sodium coolant at 3000 with a temporary part 2390. Other test the 1232 and to the placed in the 1232 and the placed in the 1233 and the placed in the placed in the 1233 and the placed in the 1233 and th

for a useful discussion of the present results and A. N. Shmelev for the computer calculations." Orig. art. has: 4 figures, 14 formulas, and 2 tables.

Card 2/3

AUGESSION NR: AP5012468

ASSOCIATION: none

SUBMITTED: 09Jul64

ENCL: 00

SUB CODE:

NO REF SOV: 603

OTHER: 000 ATD PRESS: 4008

ACC NR: AP7007582

SOURCE CODE: UR/0089/66/021/002/0084/0092

AUTHOR: Leypunskiy, A. I.; Kazachkovskiy, O. D.; Shikhov, S. B.; Yurova, L. N.; Kromov, V. V.; Shmelev, A. N.; Sukhoruchkin, V. K.

ORG: none

TITLE: Use of nonuranium dilutors of plutonium in large, fast breeder reactors SOURCE: Atomnaya energiya, v. 21, no. 2, 1966, 84-92

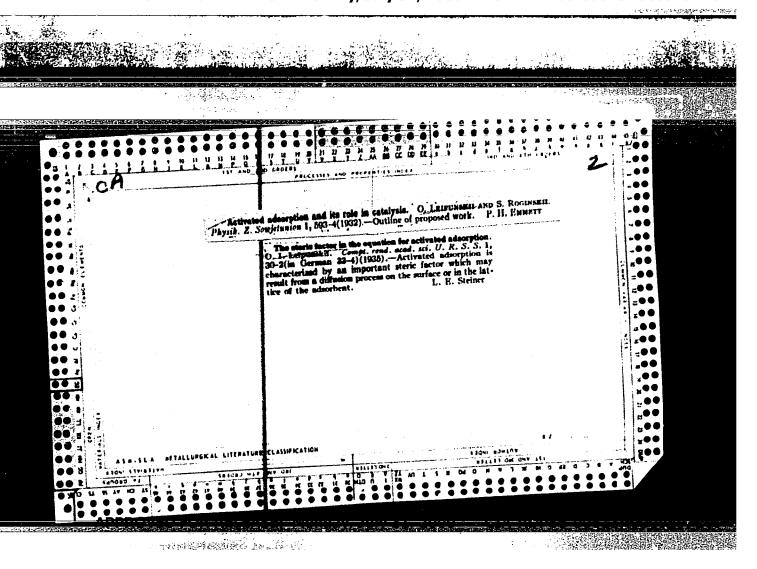
TOPIC TAGS: breeder reactor, fast reactor

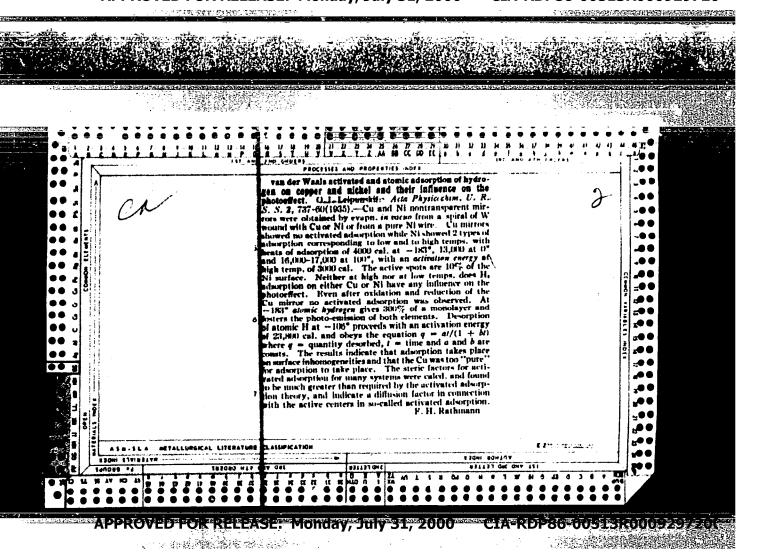
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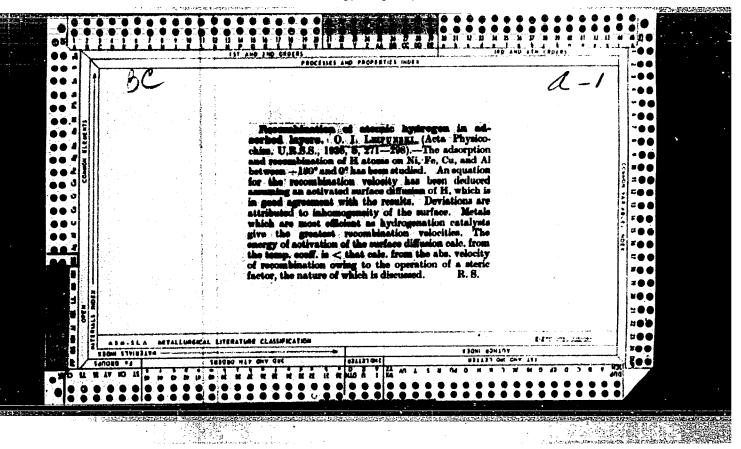
ABSTRACT: The physical characteristics of fast breader reactors with cylindrical and annular active zones have been studied, together with the characteristic of infinite lattices of large fuel elements located in a heterogeneous manner within the material of the breeder zone. The paper presents in tabular form the results of theoretical calculations, discusses the influence of Pu<sup>240</sup> and Pu<sup>241</sup>, describes the change in reactivity during the irradiation process, and shows the results of investigation of the sodium temperature coefficient and the Doppler temperature coefficient. An analysis of the results shows that the use of nonuranium dilutors of plutonium in large fast reactors (with a large active volume) results in annular active zones and zones with fuel elements within the breeder composition zones having peculiaristics which make them more economical than large cylindrical active zones. The authors thank I. S. Slesarev, A. M. Kuz'min, M. F. Troyanov, and V. M. Murogo' for their part in carrying out the research and O. N. Gerasimovaya for helping to compile information in the article. Orig. art. has: 2 figures, 3 formulas and 5 tables. [JPRS: 39,417]

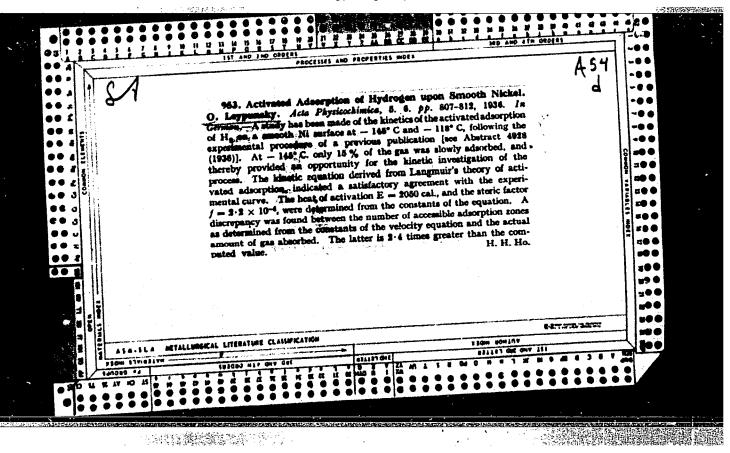
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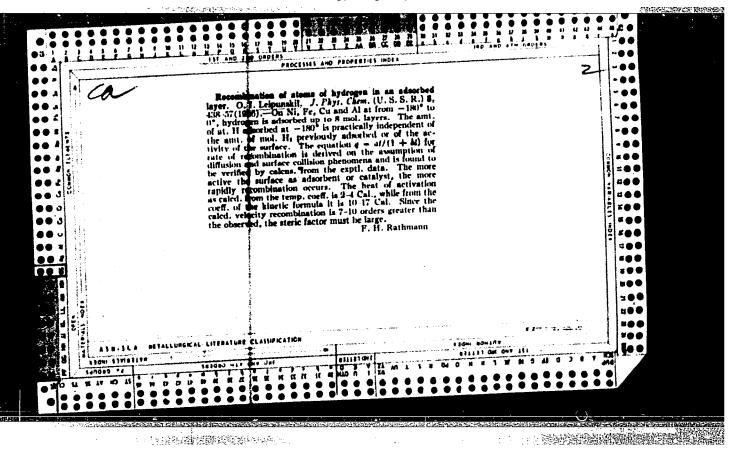
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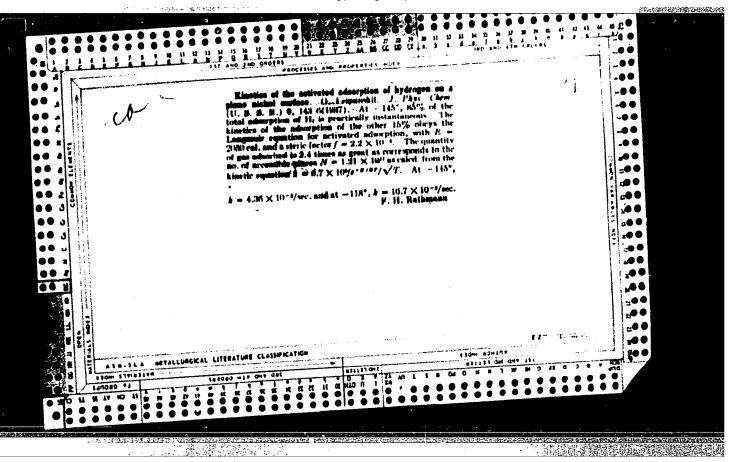


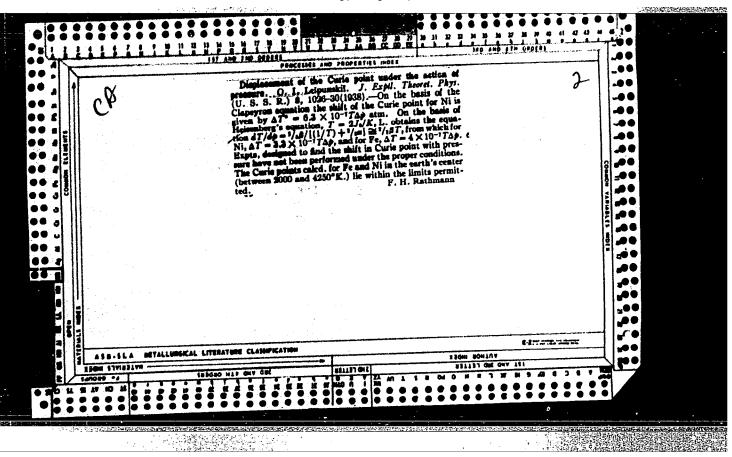


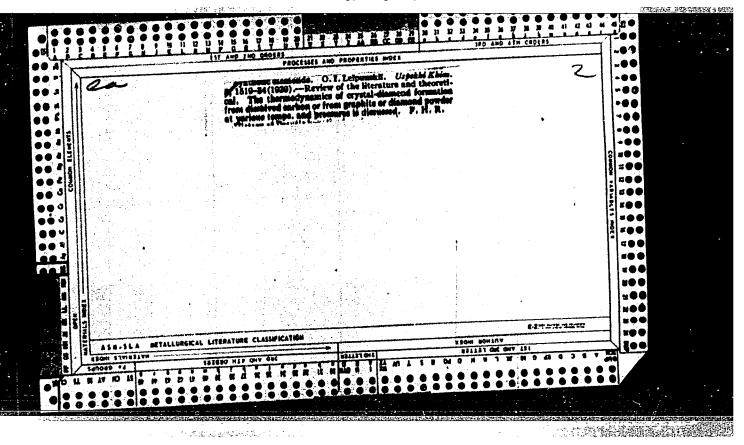


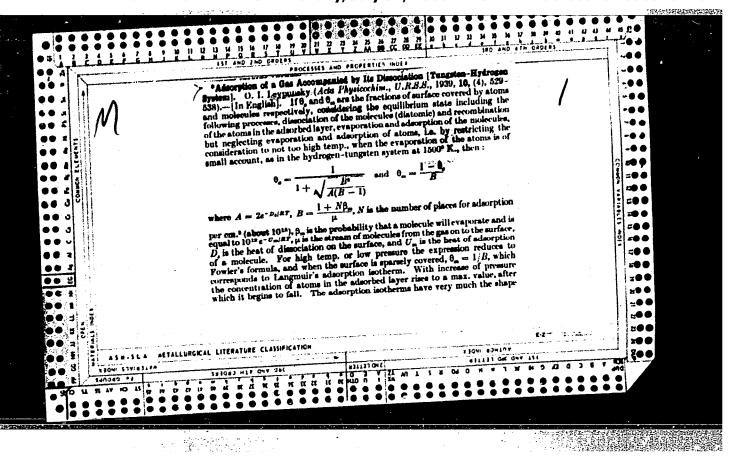












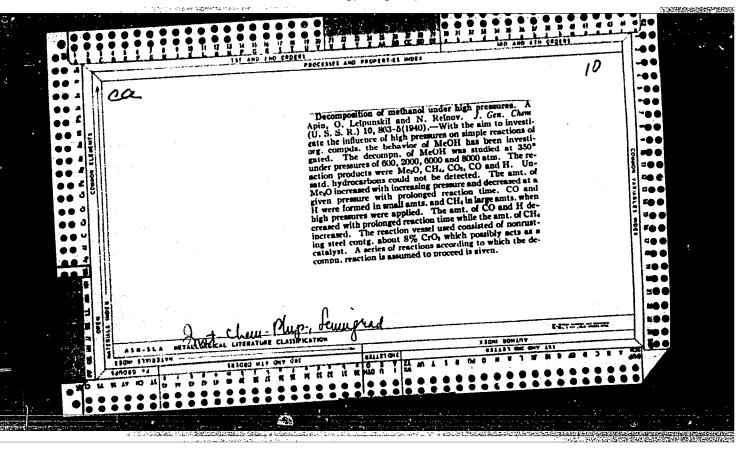
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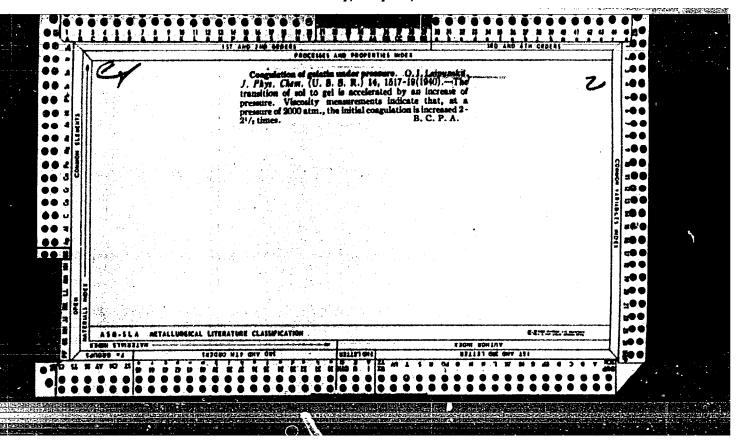
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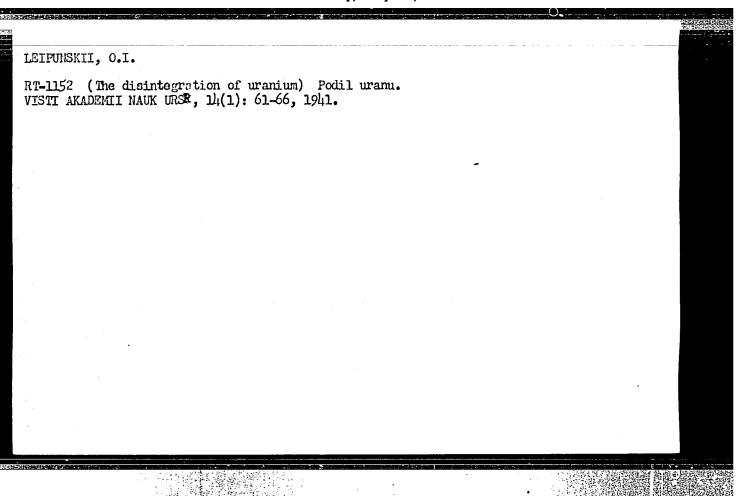
- 1. LEYPUNSKIY, O. I.
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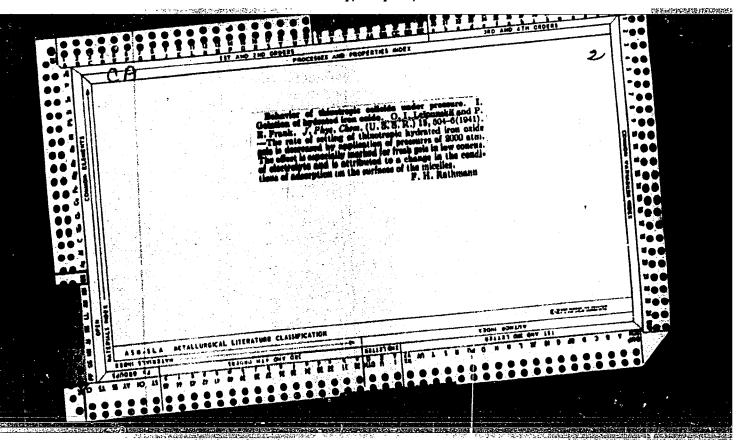
"The Adsorbtion of a Dissociating Gas". Zhur. Fiz. Khim. 13. No. 3, 1939. Leningrad, Academy of Sci. USSR, Physioc-Chemical Laboratory. Received 14 Jan. 1939.

9. Report U-1615, 3 Jan 1939.



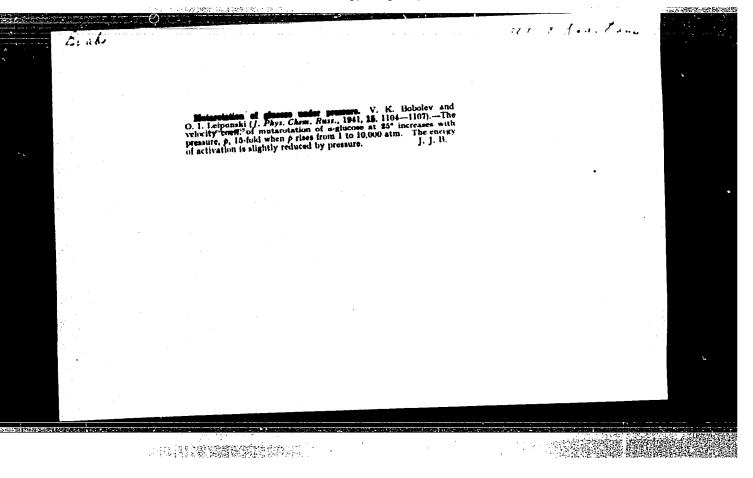


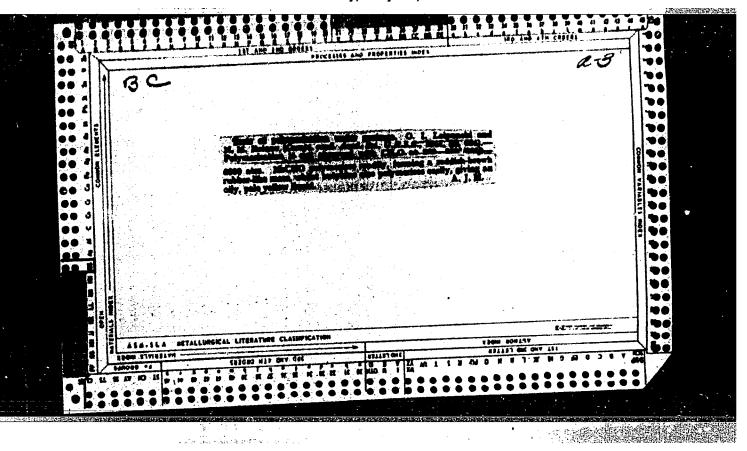




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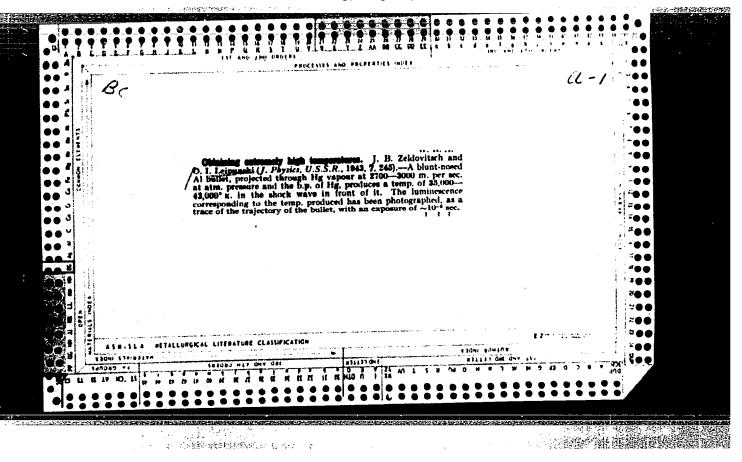
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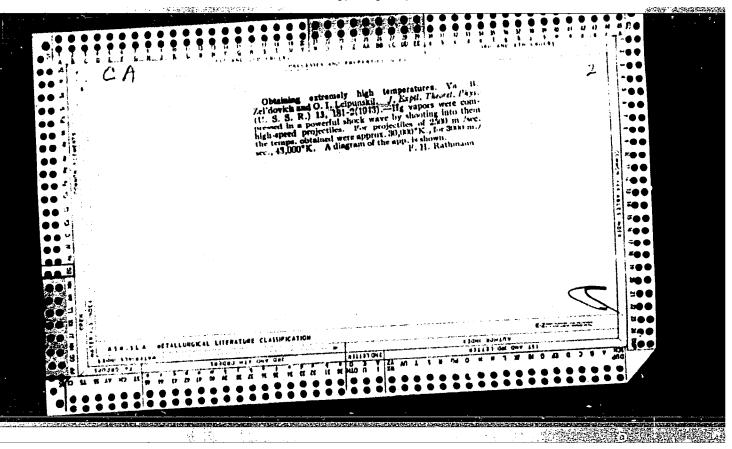




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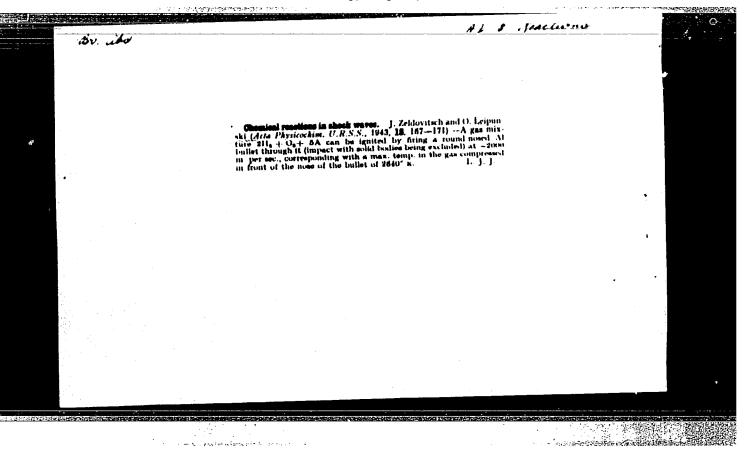
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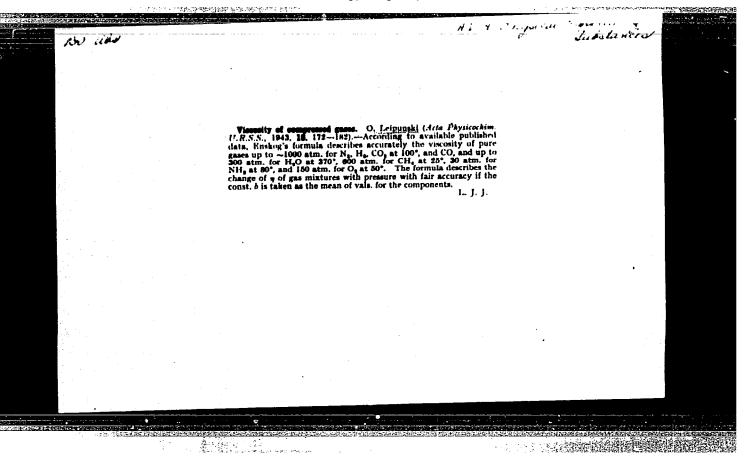


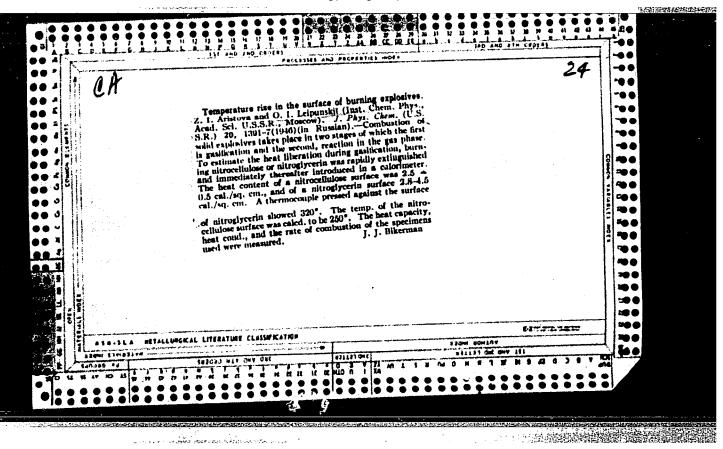


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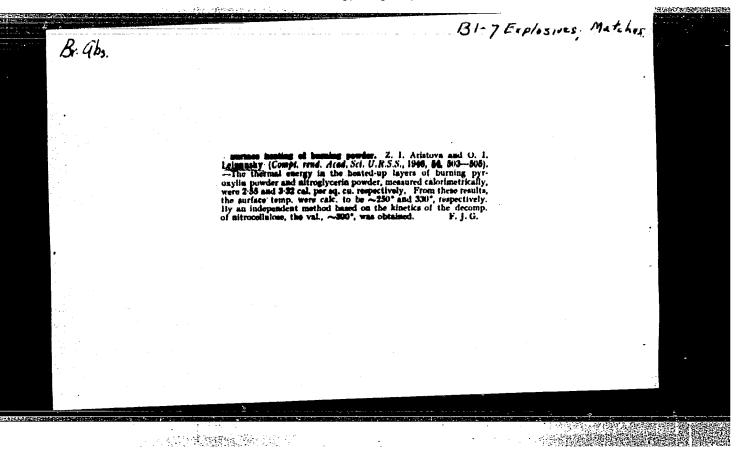


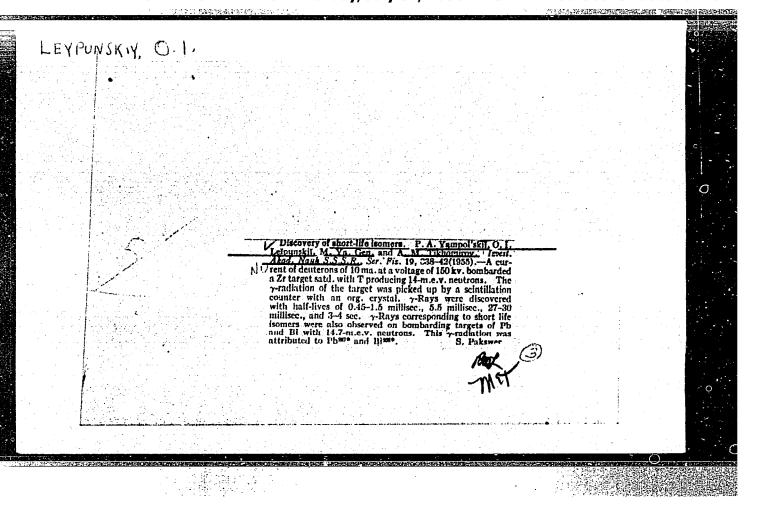




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#### CIA-RDP86-00513R000929720





## LEYPUNSKY, O.T.

SUBJECT

CARD 1 / 2 USSR / PHYSICS

PA - 1472

AUTHOR

LEJPUNSKIJ, O.I., MILLER, V.V., MOROZOV, A.M., JAMPOL'SKIJ, P.A. The Isomers with Short Period obtained by Proton Bombardment.

TITLE PERIODICAL

Dokl.Akad.Nauk, 109, fasc. 5, 935-937 (1956)

Issued: 10 / 1956 reviewed: 11 / 1956

The present work forms part of the general program of research concerning the discovery of short-lived isomers created on the occasion of nuclear reactions. Here the nuclei were excited by an impulselike bundle of 20 MeV protons. The targets of substances to be examined were located in a vacuum at an angle of 45° with respect to the bundle. Short-period  $\gamma$  -radiation occurring as a result of proton bombardment was recorded by means of a scintillation counter and  $\beta$ -radiation was recorded by means of a counter with a stilb-crystal. The impulses of the counters were amplified and discriminated by means of an integral amplitude analyzer, after which they impinged upon the screen of a special cathode oscillograph with "standing" development, and were then photographed. On the occasion of the irradiation of Be a noticeable  $\beta$ -activity was noticed with  $T_{1/2}=0.85 \pm 0.15$  sec. This activity may be ascribed to the Li<sup>8</sup>( $T_{1/2}=0.87\pm0.02$  sec) created on the occasion of the reaction Be (p,2p)Li8. The threshold of this reaction computed from the masses is 18,7 MeV. In the course of further tests new ? -activities, which had formerly not been noticed, were found, which belong to hitherto unknown isotopes. The characteristics of these & -activities are shown in a table. Apart from half lives, the estimated yields of these & -activities are given. The elements concerned are Ti, Cd, Ta, Tl, Pb, Bi. Also on the occasion

INDITIONION: THREITCUGE FOR CHEMICAL LUNATER OF THE WORKER'S OF DETERGE IN USSR.

Leypunstig, O.J.

AUTHOR: TITLE: LEYPUNSKIY, O.I., SAKHAROV, V.N., TERESHCHENKO, V.I. PA - 2312

The Short-Period & Radiation of the Fission Products of U235 and Pu239. (Korotko-periodnoye & -izlucheniye produktov deleniya U235 i Pu239, Russian).

PERIODICAL:

Atomnaia Energiia, 1957, Vol 2, Nr 3, pp 278 - 279 (U.S.S.R.). Received: 4 / 1957 Reviewed: 5 / 1957

ABSTRACT:

The present report gives the data found by the authors in 1953 on the spectral composition of the x-radiation of the fission products of U<sup>235</sup> within the time interval of 1,5 - 5 sec after fissioning. Besides, the authors deal with some conclusions drawn as to the decrease of the x-activity of the fission products of U<sup>235</sup> and U<sup>239</sup> within the same time interval. The hardness of x-radiation was determined by absorption of a collimated radiation bundle in matter. Irradiation lasted about 1 second and measuring began about 0,6 sec after the end of the irradiation. The measuring device consisted of lead collimators, a lead- or aluminium absorber, and of a steel counter SGS 400 in a glass balloon. The pulses of the counter were recorded on a film by means of a loop oscillograph.

Card 1/3

From the measuring results firstly the law of the attenuation of the bundle of y-rays on the occasion of the passage through matter, and secondly the law of the decrease of y-activity with time can

The average energy of paragraph and a logarithmic abscissa and a logarithmic ordinate illustrates the law of the decrease of U<sup>255</sup> under con-

APPROVED: FOR RELEASE: Monday, July 31, 2000 - Cha-RPP86: 00513R000929 activity after an instantaneous irradiation). This law is described satisfactorily within the time interval of from 1,25 to 17 sec after fission by a dependence of the type

 $t_{\text{sec}}^{-0,8} \pm 6 \%$ .

Also the kinetics of the decrease of the y-activity of the fission fragments of Pu<sup>239</sup> satisfy the same dependence:

 $t^{-0,8}$   $\pm$  8%, i.e. the kinetics of the decrease of f-activity agree sec

Card 2/3

ASSOCIATION: Not given.

PRESENTED BY:

23.11.1956.

SUBMITTED: AVAILABLE:

Library of Congress.

Card 3/3

89-12-7/29

AUTHOR:

Leypunskiy, O. I.,

TITLE:

The Radioactive Hazards from the Explosion of a Hydrogen Bomb and an Ordinary Atomic Bomb (Radioaktivnaya opasnost' vzryvov chistovodorodnoy bomby i obychnoy atomnoy bomby)

PERIODICAL:

Atomnaya Energiya, 1957, Vol. 3, Nr 12, pp. 530-539 (USSR)

ABSTRACT:

The hazards for the total pupulation of the earth, which are caused by the long-lived fission products that after the explosion of an ordinary atomic bomb or a hydrogen bomb respectively have scattered all over the world, are estimated. As hydrogen bomb the deuterium-tritium bomb is assumed.

The doses of irradiation on the body are computed and accordingly the number of afterwards developping sickness, especially leukemia (blood cancer), is estimated. In the case of the hydrogen bomb C14 and H3 have an especially intensive effect, whereas in the case of thenormal atomic bomb Sr90, Cs137 and C14 are the

most dangerous isotopes.

The total decay energy of the fission products originating from the hydrogen bomb is about three times higher than that of the normal atomic bomb. The main irradiation doses and the fatal losses of human lifes during the decay time of the radioactive isotopes are approximately equally high for both kinds of bombs, if

Card 1/2

AUTHOR:

LEYPUNSKIY,O.I., MOROZOV,A.M., MAKAROV,YU.V.

PA - 2705

TITLE:

YAMPOL'SKIY, P.A.

New Short-Lived Isomeres within the Millisecond Domain.

(Novyye korotkoperiodnyye izomery v millisekundnoy oblasti, Russian)

Zhurnal Eksperim. i Teoret.Fiziki, 1957, Vol 32, Nr 2, PERIODICAL:

pp 393-394 (U.S.S.R.)

Received: 5 / 1957

Reviewed: 7 / 1957

ABSTRACT:

The authors investigated such isomeric states as occur on the occasion of reactions with 20 MeV protons. Data on new isomeric activities of some elements were determined recently. The method used for the investigation of these short-lived activities were described in a previous work (0.1.LEYPUNSKIY et al., Doklady Akademii Nauk, 1956, Vol 109, Nr 935). In the case of the measurements described here the energy of 7-radiation was determined by means of a photomultiplier FEU-19 with NeJ(T1) crystals and a one-channelled differential discriminator. Also the control tests are mentioned.

A table contains the half-value periods found here and the values of the energy of f -radiation of the newly discovered activities. The half-value periods found on the occasion of control tests with different compounds of the same element agree well among

Card 1/2

LEYPUNSKIY, O.I.

AUTHOR:

Leypunskiy, O. I.

89-1-8/29

TITLE:

On the Dangers of Radioactivity in the Case of a Continuation of Tests Carried Out With Atomic Bombs (O radioaktivnoy opasnosti nepreryvnykh ispytaniy atomnykh bomb).

PERIODICAL:

Atomnaya Energiya, 1958, Vol. 4, Nr 1, pp. 63-70 (USSR).

ABSTRACT:

On the assumption that every year atomic bombs with an equivalent of limillion tons TNT (trinitrotoluene) are exploded for test purposes, the dangerous nature of radioactive precipitation falling on to the earth is evaluated.

The Sr<sup>90</sup> - concentration in bones, the number of persons afflicted with cancer of the blood, and the number of persons having suffered genetic damage is calculated. Calculations show that approximately in the year 2000 the Sr concentration in vertebral bones will have by far exceeded the hitherto assumed permissible dose with a very large part of the human race. In every following year in which the aforementioned number of atomic bombs explosions will take place, hh.ooo persons will suffer genetical damage, and 29.000 persons will be afflicted with cancer of the blood.

Card-1/0

There are 3 tables, and 5 references, 2 of which are Slavic.

Submitted: Nov 1957

AUTHOR:

Leypunskiy, O.I., Reviewer

SOV/ 89~4~6~28/30

TITLE:

On the Book by E. Teller and A. L. Latter, "Our Mecleur Future" (O kwige E. Tellera i A. Lyattera "Nashe yadarnoya bulushcheye")

PERIODICAL:

Atomnaya energiya, 1958, Vol. 4, Nr 6, pp. 608-610 (USSR)

ABSTRACT:

The chapters dealing with nuclear physics are clear, simple, and concise. The chapters dealing with the dangers connected with radioactivity are written in a tendentious manner. Besides, the conclusions drawn e.g. with respect to the influence exercised by fluctuations are of a doubtful character. Furthermore, the authors' prognoses with respect to contaminations to be expected as a result of further atomic tests are far too low. Moreover, the authors are of the opinion that there are other diseases and comditions that cause more loss of life than tests carried out with atomic bombs. To use this as an argument in favor of continuing the practice of atomic bomb tests is both dangerous and unjusti-

The authors seemed to be scared of their own courage and continue

Card 1/2

by saying that "there exist many specifically political and military reasons which make it necessary to carry out further

On the Book by E. Teller and A. Satter "Our Nuclear Future" 307/89-4-6-28/30

A-bomb tests", and this is the real core of the matter. Any attempt at justifying further A-bomb tests by describing them as being necessary in the interest of science must be rejected on principle. There are 4 references, 3 of which are Soviet.

1. Atomic bomb tests -- Effectiveness

Card 2/2

21(8) PHASE I BOOK EXPLOITATION

SOV/2797

Leypunskiy, Ovsey Il'ich

Gamma-izlucheniya atomnogo vzryva (Gamma Radiation From an Atomic Explosion) Moscow, Atomizdat, 1959. 154 p. Errata slip inserted. 7,000 copies printed.

Ed.: Z.D. Andreyenko; Tech. Ed.: Ye. I. Mazel'.

PURPOSE: This book is intended for physicists, chemists, and chemical engineers concerned with problems of gamma radiation.

COVERAGE: The book deals with the effect of gamma radiation emitted in atomic explosions. The dosage of gamma radiation and the analysis of factors affecting it are discussed at some length. The effect of shock waves on the propagation of gamma rays observed by the author and Ya.B. Zel'dovich is said to be a new aspect of the theory of diffusion of gamma quanta. The author thanks Ya. B. Zel'dovich, V.N. Sakharov, P.A. Yampol'skiy, M. Ya. Gen, N. Ya. Zel'dovich, V.N. Sakharov, V.I. Kolesnikov-Svinarev, V.I. Tereshchenko, Buben, B.V. Novozhilov, V.I. Kolesnikov-Svinarev, V.I. Tereshchenko,

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7.	Propagation of gamma radiation from a point source in a homo-	- h0
8.	geneous infinite medium  Dose rate of gamma radiation in air over a ground surface	48
9.	area covered with gamma radiation sources  Dose rate of gamma radiation over a plane layer of ab-	66
_	sorbent which contains gamma radiation sources	70
10.	Attenuation of a parallel beam of gamma rays in a plane layer of absorbent	76
11.	Albedo of gamma radiation	80
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12.	atomic explosion. Effect of the shock wave	86
13.	Intensity of short period gamma radiation. Total dose rate	101
	Gamma radiation dose. Hard component	104
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14. 15.	Gamma radiation dose. Fission-fragment component. Total dose	106
_	dose	106

Gamma Radiation From an Atomic Explosion SOV/2797						
16. Retention time of gamma radiation dose. Relationship of the doses of the fission fragment and the hard components						
17. Comments on the calculation of gamma radiation dose in protective installations	120					
Bibliography 122						
Appendix I. Gamma Radiation From Fission Fragments 123						
Appendix II. Supplementary Information on the Transmission of Gamma Radiation Through Matter 145						
AVAILABLE: Library of Congress						
TM/bg 1-19-60						

21(3), 21(6)

AUTHOR:

Leypunskiy, O. I. y building 501/89-6-1-6/33

TITLE:

\*Rays in a Muclear Explosion (Gamma-Inchi pri atomnom vzryve)

PERIODICAL:

Atomnaya energiya, 1959, Vol 6, Nr 1, pp 49-56 (USBR)

ABSTRACT:

The r-dose of a nuclear explosion depends not only on the number of radiated Y-quanta, but also on the shock wave occurring in the explosion. This shock wave causes a different kind of density distribution in the air, which leads to a decrease of Y-shaurption. Thereby, the Y-dose is, on the other hand, increased.

The shock wave forms a cavity in the zir, in which there is no absorption of p-rays. The dimensions of these cavities inuvenue with increasing explosion energy. Therefore, the p-dose does not increase in proportion with energy in a certain distance from the explosion center when energy increases, but more rapidly. The increase of the dose caused by the shock

wave may amount to several orders of magnitude.

The produced by a nuclear explosion can be determined

from the formula

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X-Rays in a Muclear Explosion

507/89-6-1-6/33

$$0 = 2.0 \cdot 10^9 \, \mathrm{E}_{\mathrm{gap}} \, \mathrm{e}^{0.4} \, \frac{\mathrm{E}_{\mathrm{pr}}}{\mathrm{E}_{\mathrm{pr}}} \, \cdot \, \mathrm{e}^{-\mathrm{i} k/252} \, \cdot \, \frac{1}{\mathrm{g}^2} \, \left[ \mathrm{r} \right],$$

where  $\mathbb{F}_{\underline{TT}}$  denotes the explosion energy expressed in 1 000 t trotyl (TNT), and E - the distance from the explosion center. If this formula is applied e.g. to the Hiroshima explosion, such conditions as were actually measured are found. Besides the resistion originating from the fission fragments a A-radiation is produced that is caused by the neutron capture of the nitrogen nucleus.

As a result of the superposition of the natural intensity decrease of the increase of p-transmissivity of air (as a result of cavity formation) the dose power curve has a minimum and a

A principal component of X-radiation which influences the explosion dose is a hard component with an energy of ~6 MeV. As, however, this component is of the same energy as the \*-capture quanta, the dose for the hard component can be caloulated from the following formula:  $D_{\text{hard}} = 4.6 \cdot 10^8 \times_{\text{PT}} \cdot \frac{e^{-R/410}}{R^2} \left[ \text{T} \right]^{6}$ 

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CIA-RDP86-00513R0009297200

-Rays in a Nuclear Explosion

SOV/89-6-1-6/33

Also in this case satisfactory agreement with the values measured at hiroshima can be found.
Ta. B. Zel'dovich, F. A. Yampol'skiy, and V. N. Sakharov took part in this work as advisers.
There are 3 figures. 2 tables, and 14 references, 5 of which are poviet.

Card 3/3

21(2),21(3)

AUTHORS:

Leypunskiy, O. I., Sakharov, V. N.

SOV/89-6-5-24/33

TITLE:

The Propagation of the Radiation of  $0^{60}$  in the Air Above the Earth (Rasprostraneniye izlucheniya  $0^{60}$  v vozdukhe nad zemley)

PERIODICAL:

Atomnaya energiya, 1959, Vol 6, Nr 5, pp 585-587 (USSR)

ABSTRACT:

The decrease of the intensity of  ${\rm Co}^{60}$   $\gamma$ -radiation in the air above the earth in distances of from 1 to 800 m from the source is experimentally determined. The  $\gamma$ -source and the detector were in a height of  $\sim$  0.7 m above ground. The sources had an intensity of  $\sim$  500 C, 10 C, 1 C, 10 mC, 1 mC. An ionization chamber with "air-equivalent walls" and a special tube counter (Ref 1) were used as  $\gamma$ -detector. The measuring head consisted of three  $\gamma$ -detectors which were arranged perpendicular to one another. Owing to this arrangement the sensitivity of the detectors was independent of intensity in all directions up to 5%. The experimentally found independence of a coefficient k of the distance between source and detector is shown by a graph. The coefficient k shows the rate at which radiation intensity decreases as a result of interaction of radiation with the air and the earth at 0° C and 740 torr air pressure. These data are compared with those obtained from

Card 1/3

The Propagation of the Radiation of Co<sup>60</sup> in the Air SOV/89-6-5-24/33

other publications. At distances of some tens of meters between the source and the detector radiation intensity increases as a result of interaction between radiation and matter. At large distances the measured intensities are lower by the 1.7 to 1.8-fold than those calculated theoretically. This confirms the opinion expressed by the authors of this paper that the dose originating from a punctiform source located on the earth must in great heights above the earth be about half of that of a source located at the same distance in a completely homogeneous medium. The results obtained may partly also be used for the purpose of determining radiation intensity above the surface of the earth if the latter is contaminated by radioactive precipitations. This task is performed by numerical integration by considering surface contamination to be the sum of point sources. In the case of a certain uniformly distributed radioactive contamination in a height of 1 m above the earth (covering density o in Mev/cm2.sec), intensity is calculated within a compass having the radius R by means of the formula

Card 2/3

The Propagation of the Radiation of Co in the Air SOV/89-6-5-24/33 Above the Earth

 $J = A.\sigma$  [Mev/cm<sup>2</sup>.sec]. For a  $\gamma$ -contamination of the intensity J the A-values for distances of 25, 50, 100, 200, 500 m and  $\infty$  are tabulated. There are 1 figure, 1 table, and 5 references, 2 of which are Soviet.

SUBMITTED:

December 12, 1958

Card 3/3

## PHASE I BOOK EXPLOITATION

sov/5065

Leypunskiy, Ovsey Il'ich, Boris Vasil'yevich Novozhilov, and Wevolod Nikolayevich Sakharov

Rasprostreneniye gamma-kvantov v veshchestve (Propagation of Gamma-Ray Quanta in Matter) Moscow, Fizmatgiz, 1960. 207 p. 6,000 copies printed.

Ed.: Margulis, U. Ya; Tech. Ed.: Murashova, N. Ya.

PURPOSE: This book is intended for physicists, engineers, and advanced students concerned with the applications of nuclear physics in industry, as well as with the applications of radio isotopes.

COVERAGE: The book discusses the theory of Y -quanta propagation and absorption in matter, taking into account the multiple scattering of quanta. It gives the quantitative characteristics (calculated and experimental) of Y-rays for the various representative cases of radiation propagation: propagation in an infinite medium, passage through a layer of finite thickness, reflection from the boundary surface (albedo), etc. Data are given on the attenuation, and the spectral and angular distribution of Y-radiation.

Card 1/4

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AUTHOR:

Leypunskiy, O. I. (Moscow)

B010/B014

TITLE:

Pressure Dependence of the Combustion Rate of Black Powder

PERIODICAL:

Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 1, pp 177-181

(USSR)

ABSTRACT:

In the present paper the author studied the pressure dependence of the combustion rate of black powder. A physical theory for the combustion of smokeless powder was elaborated by Ya.B.

Zel'dovich (Ref 1), which is based upon A. F. Belyayev's (Ref 2) concept of the combustion of volatile, liquid explosives in the vapor phase. Though this is a similar process, it is not possible without any difficulty to apply Zel'dovich's theory to black powder because of the different nature of the substances. It is assumed that, when the powder burns, a dispersion takes place which was observed for the first time by N. F. Pokhil. A gas - coal mixture is formed from gases discharged by the decomposing saltpeter. The coal particles are burned in the current of this mixture. Pressure has no influence on the duration of combustion of these particles. The pressure dependence of the combustion rate is, however, similar to Ya. B.

Card 1/2

APPROVED FOR RELEASE: Monday, July 31, 2000

CIA-RDP86-00513R000929

## LEYPUNSKIY, O.I.

Possible magnetic effect in high-altitude explosions of atomic bombs. Zhur. eksp. i teor. fiz. 38 no.1:302-304 Jan '60. (MIRA 14:9)

(Magnetic fields) (Atomic bomb--Testing)

LEYPUNSKIY, Ovsey Il'ich

Gammaradiation of an atomic explosion. New York, USJPRS, 1961.

x11, 155 p. diagrs., graphs, tables. (AEC-tr-4516 Physics.

Translation Series)

On cover: United States Atomic Energy Commission.

Division os Technical Information.

Translated from the original Russian: Gamma--izlucheniye atomnogo

vzryva, Moscow, 1959.

22877 S/089/61/010/005/005/015 B102/B214

AUTHORS: Le

Leypunskiy, O. I., Strelkov, A. S., Frolov, A. S.,

Chentsov, N. N.

TITLE:

The propagation of the  $\gamma$ -radiation of a prompt point source

in air

PERIODICAL: Atomnaya energiya, v. 10, no. 5, 1961, 493-500

TEXT: The present paper gives a calculation of the propagation of an infinitely short gamma radiation pulse (δ pulse) in air space considered as infinite. The calculation is made by the Monte-Carlo method. The initial gamma radiation energy is assumed to be 1 Mev and the density of air to be 1.29·10<sup>-3</sup> g/cm<sup>3</sup>. The point source considered emits isotropically. The direction of motion of one of the quanta emitted by the source and suffering collision is described by the Klein Nishina indicatrix. A special method is developed for the solution of the transcendental equation obtained. The absorption of the quanta is taken into account by a weight factor. A quantum packet thus moves along a trajectory; each trajectory is followed till the weight is only just 10<sup>-4</sup> times the initial weight.

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The propagation of the y-radiation of a...

22877 \$/089/61/010/005/005/015 B102/B214

The object of the calculations is to determine the quantity  $\Phi_{kjim}$  i.e. the energy transferred at a distance  $R_k$  from the source in the time  $t_j$ - $t_{j+1}$  through a unit area perpendicular to the flux by gamma quanta of energy  $E_i - E_{i+1}$  whose directions of motion make an angle  $\theta_m - \theta_{m+1}$  with the radius vector of the point of observation. The intensities  $I_{kjim}^0 - \Phi_{kjim}^0 \Delta t_j \Delta E_i \Delta \Omega_m$  can be determined from  $\Phi_{kjim}^0$ . The following numerical values are taken as the basis of the calculations: 1)  $R_k = 250$ , 500, and 1000 m corresponding to  $\mu_0 R_k = 2.03$ , 4.08, and 8.12 free paths; 2)  $t_j = 0$ , 0.125, 0.250, 0.500, 1.00, 1.50, 2.00, 3.00, 4.00,  $\infty \mu sec$ ; 3)  $E_i = 0$ , 0.0625, 0.125, 0.250, 0.500, 1.00 and 2.00 Mev; 4)  $\theta_m = 0$ , 10, 40, 90, 180°. The applicability of the method was checked by comparison of the build-up factors obtained by integration of  $I_{kjim}^0$ . The result is

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The propagation of the  $\gamma$ -radiation of a...

S/089/61/010/005/005/015 B102/B214

$R_k$ , m $(\mu_o R_k)$	250 (2.03)	500 (4.06)	1000 (8.12)
Monte-Carlo method	3.69	7•57	21.8
method Ref. 6	3.6	7.5	18.6

(Ref. 6: H. Goldstein, J. Wilkins. Rept. U. S. Atomic Energy Comm., No. 40, 3075 (1955)). The investigation of the time dependence of the pulse of the gamma source (scattered quanta) for observation points at different distances showed that the pulse became broader with increasing distance. The duration of the decrease of energy amounts to 0.5, 1.0, and 1.5 µsec, respectively, for R = 250, 500, and 1000 m. The unit of intensity is taken to be the intensity during 0-0.125 µsec. The absolute values of the intensity in this interval over the whole spherical surface for these three R values are 1.43, 0.41, and 0.0088 Mev/µsec, respectively. The investigation of the time energy spectra for different distances showed that for a given time interval at R>250 m the form of the spectra remain practically unchanged. The investigation of the time dependence of the energy for different R values showed that for t>1-1.5 µsec the mean hardness of the radiation remains practically unchanged (50-60 kev). From

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The propagation of the  $\gamma$ -radiation of a...

S/089/61/010/005/005/015 B102/B214

a comparison of the I(t) curves in given solid angles for different R values it is found that the decrease of intensity at  $0 < 90^\circ$  is delayed with increasing distance. With increasing t and 0 and a given R<sub>k</sub> the

spectra become softer. Table 2 gives the numerical data for the angle distribution of the scattered gamma radiation; Table 3 gives the same for the total intensity. An estimate of the accuracy of the calculation of the time dependence of the intensities gives for  $t=1~\mu sec$  15-20 %, and for  $t>1~\mu sec$  40-50 %. For the time dependence of the energies the situation is analogous. The authors thank I. M. Gel'fand for collaboration. There are 6 figures, 3 tables and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc.

SUBMITTED: July 7, 1961

Legend to the Tables: 1)  $\theta$  in degrees, 2) R in meters; the intensities are given in %.

Card 4/5

S/796/62/000/003/010/019

AUTHOR: Leypunskiy. O.I.

TITLE: Fast-neutral-dose measurement. (A brief survey.)

SOURCE: Moscow. Inzhenerno-fizicheskiy institut. Pribory i metody analiza

izlucheniy. no.3. 1962, 97-104.

Thermal-neutron-dose measurement (at energies below the 0.4-ev TEXT: absorption threshold of the Cd filter) is usually performed separately from fastneutron-dose measurement (above 1 mev); Measurement of neutrons of intermediate energy is inhibited by lack of suitable instrumentation. The resulting underestimation of the total neutron dose may be extremely significant in some circumstances, both physically and biologically. The primary difficulty in measuring neutron doses is a lack of correlation between tissue ionization and direct biological effect, as that obtaining in the instance of y-rays. A relative biological effectiveness (RBE) must be introduced, a factor further complicated by the dependence of the effective RBE not only on the protons but also on the y-rays (from thermal-neutron capture), the contribution of which depends on the neutron energy. It is, therefore, necessary to measure separately the doses attributable to y-radiation and to neutrons. V.I. Ivanov's proportional sensor (In Sbornik rabot po nekotorym voprosam dozimetrii i radiometrii. Ed. by Yu. V. Sivintsev, No. 2. Moscow. Atomizdat, 1960) is critically reviewed. It fails to measure the intermediate-energy neutrons. The Monte Carlo

Card 1/2

Fast-neutral-dose measurement.

\$/796/62/000/003/010/019

techniques outlined by N. Snyder, et al. (Brit. J. Radiol., v. 28, 1955, 330, 342) and A. M. Kogan, et al. (Atomnaya energiya, v. 7, 1959, 351) specify instrument characteristics which may be met by dosimeters designed according to reasonings expounded by Panger, Roesch (Nucl. Instr. Meth., v. 5, 1959, 2) and A. M. Kogan, et al. (Atomnaya energiya, v. 4, 1959, 386), namely, that a depth (15 cm) exists in a paraffine block at which the concentration of thermal neutrons is independent of the energy of the impinging neutrons. A device with a thermal-neutron indicator buried at such a depth in a paraffine block probably is used in the American individual under-arm dosimeter (Karp, J., Rev. Sci. Instr., no. 10, 1957). An assessment of the dose of neutrons of intermediate energy appears possible with the aid of resonance indicators by the method of Boron filters. The total dose of the neutrons is obtained by adding the intermediate-energy neutron dose thus measured to the dose measured by a threshold dosimeter. There are 2 figures and 9 references (4 Russian-language Soviet and 5 English-language).

ASSOCIATION: None given.

Card 2/2

S/089/62/012/003/005/013 B102/B108

AUTHOR:

Leypunskiy, 0. I.

TITLE:

Physics of shielding

PERIODICAL: Atomnaya energiya, v. 12, no. 3, 1962, 216 - 229

TEXT: The present article is a review on publications of the last years concerning the main problems of "shielding physics", a term proposed by V. G. Kirillov-Ugryumov. Questions of radiation detection and measurement contamination, and biological problems are discussed. L. R. Kimel' (Atomnaya energiya, 12, no. 3, 236, 1962), V. I. Kukhtevich, B. P. Shemetenko (Atomnaya energiya, 12, no. 3, 204, 1962), Ye. A. Kramer Ageyev, V. P. Mashkovich, I. V. Petryanov, and Yu. V. Sivintsev (Fonovoye oblucheniye chelovecheskogo organizma. M., Atomizdat, 1960) are mentioned. There are 2 figures, 4 tables, and 71 references: 54 Soviet and 17 none Soviet. The four most recent references to English-language publications read as follows: D. Easterly et al. J. Dairy Sci., 43, 137 (1960); W. Bungo, J. Genetic Japan, 35, no. 7, 205 (1960); Pritchheerd. Conference Monaco, v. 2, Vienna, IAEA, 1960, p. 231; R. Russel et al. Science, 128, 1546 (1958). Card 1/2

S/089/62/012/003/005/013 B102/B108

Physics of shielding

SUBMITTED: July 10, 1961

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33969

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AUTHORS:

Kimel', L. R., Leypunskiy, O. I.

TITLE:

The gamma radiation field of a monodirectional point source

PERIODICAL: Atomnaya energiya, v. 12, no. 3, 1962, 236 - 237

TEXT; Since gamma radiation sources with arbitrary angular distributions can be considered as superpositions of monodirectional point sources, this new type of elementary source is of great interest. The radiation field of a collimated gamma beam from Cs  $^{137}$  or Co  $^{60}$  was measured in a 90  $^{\circ}$  90  $^{\circ}$  90 cm water phantom; the beam entered the water in the middle of the tank. An CT(-5 (STS-5) counter was used as a detector; for direct beam measurements, a scintillation detector and a small CM-26T (SI-28G) counter were used. Measurements were made at distances of 12, 18, 24, 30, 36, and 42 cm along the beam and at 5, 7, 10, 15, 20, and 30 cm from the beam axis. The distribution curves show two sections; a steep drop at small distances (~1cm) and an almost linear and slow decrease at greater distances. From an experimental analysis, the relation  $E_p(\mu_0 h, \mu_0 x)$ 

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The gamma radiation field of ....

=  $E_0 e^{-\mu_0 h} \mu_0^2 \mu_0 h \sqrt[4]{\frac{2\pi\mu_0 h}{3(B-1)}\mu_0 x}$  Mev/cm² sec was obtained which fits the experimental curves with an accuracy of about 10%. h is the distance along the beam, x the distance from it,  $\mu_0$  the linear attenuation factor for the primary quanta,  $E_0$  the beam energy (Mev/sec),  $\Phi(z) = e^{-z} - z \int_0^z \frac{e^{-t}}{t} dt$  is the

King function (tabulated), B - energy build-up factor for a plane monodirectional source. There are 1 figure and 7 references: 5 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: F. Kirn et al. Radiology, 63 (1), 94 (1954); H. Goldstein, S. Wilkins. US AEC Report. NYO-3075 (1954).

SUBMITTED: October 18, 1961

Card 2/2

ZEL'DOVICH, Yakov Borisovich; RIVIN, Mikhail Abramovich[deceased];
FRANK-KAMENETSKIY, David Al'bertovich; LEYPUNSKIY, O.I., doktor
fiz.-mat. nauk, prof., red.; BOGOMOLOVA, M.F., red.izd-va;
SKOTNIKOVA, N.N., tekhn. red.

[Jet-power impulse of powder rockets] Impul's reaktivnoi sily porokhovykh raket. Moskva, Oborongiz, 1963. 189 p. (MIRA 16:3)

(Solid propellant rockets) (Jet propulsion)

L 9874-63 EWT(1)/EPF(n)-2/BDS AFFTC/ASD/AFWL/SSD Pu-4 IJP(C)
ACCESSION NR: AP3002266 S/0089/63/014/006/0577/0579

AUTHOR: Leypunskiy, O. I.; Kimel', L. P.; Panchenko, A. M.

TITLE: Gamma-radiation field of collimated point sources Cs sup 137 and Co sup 60 in iron

SOURCE: Atomnaya energiya, v. 14, no. 6, 1963, 577-579

TOPIC TAGS: gamma radiation, point radiation sources, Cs sup 137, Co sup 60, iron, plane radiation sources, energy buildup factors

ABSTRACT: Measurements have been made of the spatial distribution of scattered gamma quanta in an iron block measuring 16 x 18 x 25 cm from highly collimated point sources Cs sup 137 and Co sup 60 with activities from 1 to 0.55 curie. The geometry of the experimental setup is shown in Fig. 1 of the Enclosures. The block consisted of separate sheets of iron. An SEM-10/gas-discharge counter; with a special screen to reduce energy dependence and provide practically isotropic sensitivity of the counter, served as the detector. The measurements were made at points with h and r coordinates, where h = beam distance from the entrance to the middle, and r = radial distance in the plane

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ACCESSION NR: AP3002266

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perpendicular to the beam. For Cs sup 137 the measurements were made at five fixed points: 1.19, 2.56, 3.92, 5.28, and 6.65 (where the numbers represent multiples of the mean free path). For Co sup 60, the values used were 1, 4, and 5. The results are shown in Figs. 1 and 2. A formula (see Formula 1 of the Enclosures) has been derived from data for the Cs sup 137 source for calculating the buildup factor B sub E for a plane collimated source. Within the limits of experimental error, the calculated values of the buildup factor for a plane collimated source in iron at the energies of primary gamma quanta of 0.661 Mev were found to be in good agreement with the experimental data of H. Goldstein and S. Wilkins (US AES Report NYO-3075 (1954)). Similar experiments have been conducted for concrete, aluminum, and lead. "In conclusion, the authors express their appreciation to V. I. Ivanov and V. P. Mashkovich for valuable advice expressed during the review of the work." Orig. art. has: 3 figures and 1 formula.

ASSOCIATION: none

SUBMITTED: 29Sep62

Sep62 DATE ACQ: 12Ju163

ENCL: 03

SUB CODE: 00

NO REF SOV: 004

OTHER: 005

Card 2/5

AEDC/AFFTC/AFGC/ EPA/EPR/EPF(a)/ENT(m)/BDS/ES(s)-2 RM/NW/BH-2/JW/JFW/JWD/H S/0020/63/151/003/0604/0607 Paa-4/Ps-4/Pt-4 RPL/SSD ACCESSION NR: AP3003856 AUTHOR: Bobolev, V. K.; Glazkova, A. P.; Zenin, A. A.; Leypunskiy, TITIE: Temperature profile in emmonium perchlorate SOURCE: AN SSSR. Doklady\*, v. 151, no. 3, 1963, 604-607 TOPIC TAGS: emmonium perchlorate, temperature profile, flame temperature, surface temperature, condensed phase, gas phase, pressure effect, burning rate, heat release, heat barrier, heat flor, diffusion, combustion product, catalyst, ammonium perchlorate burning rate, ammonium perchlorate flame temperature, ammonium perchlorate combustion ABSTRACT: The anomalous combustion pattern of ammonium perchlorate at pressures above 150 atm has prompted a study of the temperature profile of the condensed and gas phases in the combustion process. Flame-temperature measurements were serviced out by the method of thin thermocouples developed by A. A. Zenin. Compacte! samples of ammonium perchlorate were held at a constant pressure within the 30-350-atm range in a nitrogen atmosphere. Mimultaneous photorecording of the burning rate and combustion pattern and oscillographic recording of temperature were provided. The recorded oscillograms and derived temperature profiles Card 1/3

L 13332-63 ACCESSION NR: AP3003856

showed two distinct combustion patterns: a stable one within 40-150 atm and an unstable one within the 160--350 atm. The region of unstable combustion was characterized by temperature fluctuations with a high (up to 500C) amplitude in the gas phase, followed by a leveling off of temperature at about 2700C, which was assumed to be also the temperature at the surface. The surface temperature (Ts) was determined either indirectly from the maximum heat release in the condensed phase or directly by a method proposed by P. F. Pokhil (Sborn. Fizika vzry\*va, no. 4, 1955 and no. 2, 1956). The increase in overall heat release with increasing pressure observed within the region of stable combustion was attributed in part to a simultaneous increase in heat release in the gas phase and in part to a change in the mechanism of chemical reactions. The heat release in the condensed phase, and hence  $T_{\rm g}$ , decreased with increasing pressure and approached the temperature of phase transition within the range of unstable combustion. The existence of a heat barrier (80 cal/g) between the two combustion regions was determined from the identity of the experimental heat release at 150 atm in the condensed phase and the calculated amount of heat required to bring the condensed phase to 270C. Heat absorption in the phase transition might be responsible for the decrease in burning rate which leads to flame extinction. The surface temperature in the 50-150 atm pressure range was found

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ACCESSION NR: AP3003856

to be relatively low (300-4300), which indicates a heat flow and hence diffusion of molecules and free radicals from the flame zone towards the surface. Activated combustion products are assumed to act as catalysts of thermal decomposition on the perchlorate surface. The assumption is extended to the combustion of any condensed system in which heat flows from the gaseous reaction zone toward the surface. The article was presented by Academician Ya. B. Zel'dovich on 9 April 1963. Orig. art. has: 4 figures.

ASSOCIATION: Institut khimicheskoy fiziki akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences SSSR)

SUBMITTED: 31Mar63

Mar63 DATE ACQ:

ENCL: 00

SUB CODE: CH

NO REF SOV: 006

15Aug63

OTHER: 004

Card 3/3

\$/0207/64/000/003/0153/0158 ACCESSION NR: AP4041206 AUTHORS: Bobolev, V. K. (Moscow); Glazkova, A. P. (Moscow); Zenin, A. A. (Moscow); Leypunskiy, O. I. (Moscow) TITIE: A study of the temperature distribution in the combustion of ammonium perchlorate SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 3, 1964, 153-158 TOPIC TAGS: temperature distribution, combustion rate, pressure effect, flame temperature, grain effect, phase change, decomposition, point thermocouple, sublimation, condensation, combustion stability, heat liberation, oscillograph H 700 ABSTRACT: Studies of the combustion of preheated ammonium perchlorate at belowatmospheric pressure show that the combustion rate is limited by the equilibrium endothermic decomposition of NH4ClO4 to NH3, and HClO4. A zone combustion treatment of burning indicated, however, that the decomposition was exothermic. The point thermocouple method, developed by A. A. Zenin (Izucheniye raspredeleniya temperatury\* pri gorenii kondensirovanny\*kh veshchestv. Dissertatsiya, Moscow, 1962) was used in this paper to study the temperature distribution of

Cord 1/3

ACCESSION NR: AP4041206

ammonium perchlorate combustion. Two p-type thermocouples, W+Re (5 and 20%Re) with diameters of 15 and 30  $\mu$  and a thickness of 3.5 and 7  $\mu$  respectively, were used. The 7-mm samples of unfiltered perchlorate (pressed to a density of 1.93-1.94g/cm3) were treated over the pressure range 40-350 atmos of nitrogen. The thermocouples were impressed in the samples at a pressure of 3000-3500 kg/cm<sup>2</sup>. Maintaining the pressure for 15-20 minutes produced transparent samples. The temperature distribution was recorded on a loop oscillograph H-700, and the speed and character of combustion were photographed. It was discovered that at the end of combustion there was a temperature fluctuation ( 50 msec and 500-1000C). The flame temperature fluctuation and plateau agreed well with the decreased brightness in the photographs, but complete examination of the oscillogram for unstable burning was not possible. This would require more precise recording of the fluctuation of the burning rate (perhaps with high-speed motion pictures). In some cases the burning was extinguished. Temperature profiles were obtained from 40-350 atm, which showed the presence of 2 combustion schemes for ammonium perchlorate, stable (40-150 atm) and unstable (160-350 atm). Abnormalities were discovered in the relation of the surface temperature and heat liberation (in the condensation phase) to the pressure. Assumptions were made concerning; 1) the variation of the ammonium perchlorate combustion mechanism with the growth of pressure; 2) the qualitative effect of the products passing from the reaction

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#### "APPROVED FOR RELEASE: Monday, July 31, 2000

CIA-RDP86-00513R000929720

ACCESSION NR: AP4041206

zone in the gas phase to the surface by gasification of the condensation phase. An hypothesis was proposed concerning the reason for the decrease in the ammonium perchlorate combustion rate with an increase in pressure above 150 atm. An and the kinetic gasification of perchlorate with combustion. Orig. art. has: 6 figures.

ASSOCIATION: none

SUBMITTED: 15Apr63

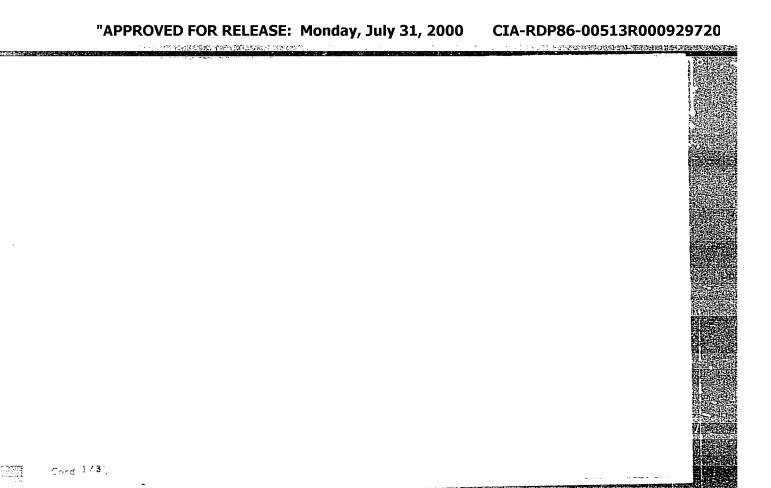
SUB CODE: GC

NO REF SOV: OOL

ENCL: 00

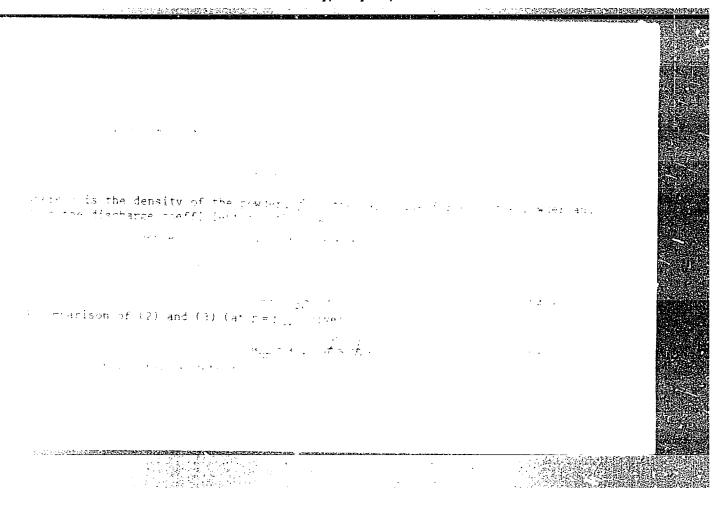
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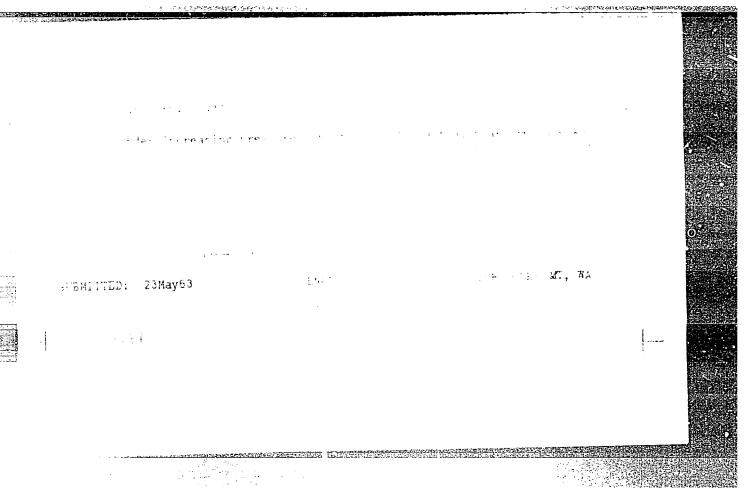
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ACCESSION NR: AP4030789

\$/0020/64/155/004/0897/0899

AUTHOR: Leypunskiy, O. I.

TITLE: A possible influence of the diffusion flow of the reaction products from flames upon the decomposition of the condensed phase

SOURCE: AN SSSR. Doklady\*, v. 155, no. 4, 1964, 897-899

TOPIC TAGS: explosive, explosive powder, powder explosive, powder combustion, condensed phase decomposition, nitroglycol, reaction product diffusion flow, flame reaction product

ABSTRACT: It is generally accepted that the Gamma-phase (gaseous phase) takes part in the decomposition of the K-phase (condensed phase) by furnishing a flow of heat with which the requisite mass rate of decomposition is assured. The purpose of this paper is to examine the possibility of another reaction mechanism of which the Gamma-phase effects the decomposition rate of the K-phase, by catalysis of the decomposition reaction in the K-phase with products of the com-

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bustion (among them, active molecules) diffusing from the flames to the surface of the K-phase. Ya. B. Zel'dovich (Zh. E. T. F., nos. 11-12, 498, 1942) has shown that, under conditions of equality of the coefficients of thermal conductivity and diffusion in the gaseous mixture, the concentrations of combustion products and decomposition products on the surface of the powder are equal to:

$$a_{\rm r} = \frac{T_{\rm n} - T_{\rm o}}{T_{\rm r} - T_{\rm o}}, \qquad a_{\rm p} = \frac{T_{\rm r} - T_{\rm n}}{T_{\rm r} - T_{\rm o}},$$
 (1)

where Tg is the powder's combustion temperature; Tp is the powder's surface temperature; To is the initial powder temperature. It is a natural consequence of this theory that, under conditions where coefficients of thermal conductivity and diffusion are equal along the coordinates at which the transfer occurs, the value of the enthalpy remains constant. Equating the enthalpy values for the gas mixture at the powder surface and in the combustion zone, the following relationship is obtained:

$$a_p q + c_\rho T_n = c_\rho T_F. \tag{2}$$

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Then

$$a_p = \frac{c_p (T_r - T_n)}{q}, \quad a_r = 1 - a_p = \frac{q - c_p (T_r - T_n)}{q}.$$
 (3)

The chemical energy of the gasification products q is spent for heating the gases from  $T_p$  and to  $T_g$  and a certain Kth part for heating the powder from  $T_o$  to  $T_p$ :

$$q = c_p (T_r - T_n) + Kc (T_n - T_0).$$
 (4)

The experimentally observed values for K can be small, K = 0, 1, for example. Estimations showed that the amount of combustion products at the surface of the burning powder is not negligibly small, and does not contradict the hypothesis concerning their catalytic action. "The author expresses his gratitude to V. B. Librovich for discussion and help in this study." Orig. art. has: 9 equations

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences SSSR)

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WW/JW/JWD EWT(d)/EWT(1)/EWT(m)/T ∴ĬJP(c) 1. 46316-66 UR/0020/66/169/003/0619/0621 ACC NR: AP6027959 SOURCE CODE: A. A.; Leypunskiy, O. I.; Margolin, A. D.; Nefedova, AUTHOR: Zenin, O. I.; Pokhil, P. F. ORG: Institute of Chemical Physics, Academy of Sciences, SSSR/(Institut khimicheskoy fiziki Akademii nauk SSSR) Temperature field at the surface of burning gunpowder and TITLE: combustion stability ! AN SSSR. Doklady, v. 169, no. 3, 1966, 619-621 SOURCE: gunpowder, combustion stability, temperature field, TOPIC TAGS: stability exiterion temperature distribution Temperature distribution at the surface of burning gunpowder ABSTRACT: H was measured at initial surface temperatures ranging from -196 to 140C and pressures of 1-20 atm. The experimental data were used to determine the values of combustion stability criteria for various temperatures and pressures. Comparison of the experimental results with published theories showed that the Zel'dovich stability criterion (ZhETF, 12, 498, 1942), which was derived on the assumption that the temperature of the powder surface does not change with changing burning velocity and that there is no heat release in the condensed phase, is UDC: 541.126+536.462 Card 1/2 .\_ . . . . . .

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valid only at low temperatures. The criterion derived by Istratov Librovich (Zhurn. prikl. mekh. i tekhn. fiz., No. 5, 38, 1964) and the criterion derived by Novozhilov (ZhPMTF, No. 4, 157, 1965) are valid over the entire temperature range studied. Orig. art. has: 4 table [PS]	d
SUB CODE: 21/ SUBM DATE: 15Nov65/ ORIG REF: 010/ ATD PRESS:5	151
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SOKOLOVA, R.S.; LEYPUS, V.M.

The FM-40 attachment to the SR-4 spectrophotometer used for measuring the coefficient of reflection, Opt.-mekh.prom. [25] no.3:34-36 Mr \*58. (MIRA 11:9) (Spectrophotometer) (Reflection (Optics)--Measurement))

# LEYRER, R.

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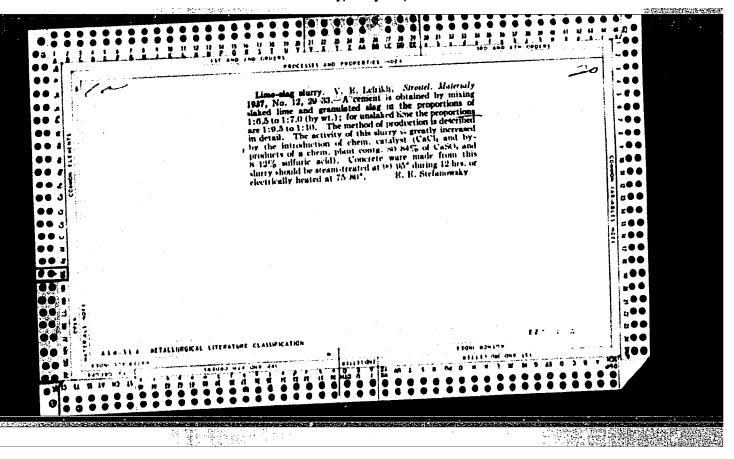
2. Glavnyy inzhener upravleniya promyshlennosti stroitel'nykh materialov Novosibirskogo sovnarkhoza (for Leyrikh).

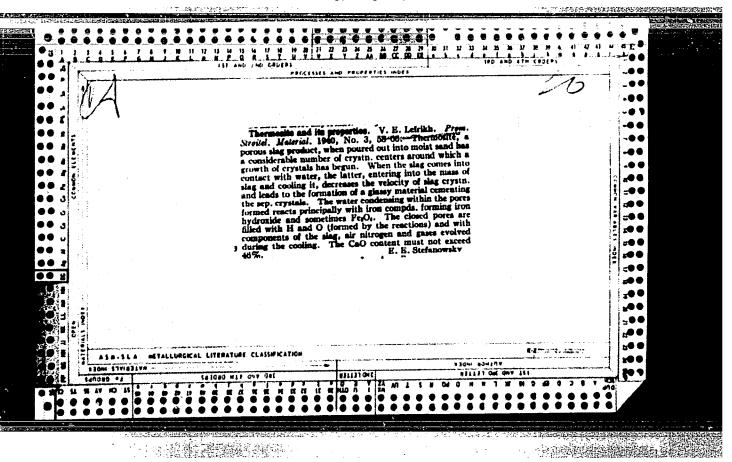
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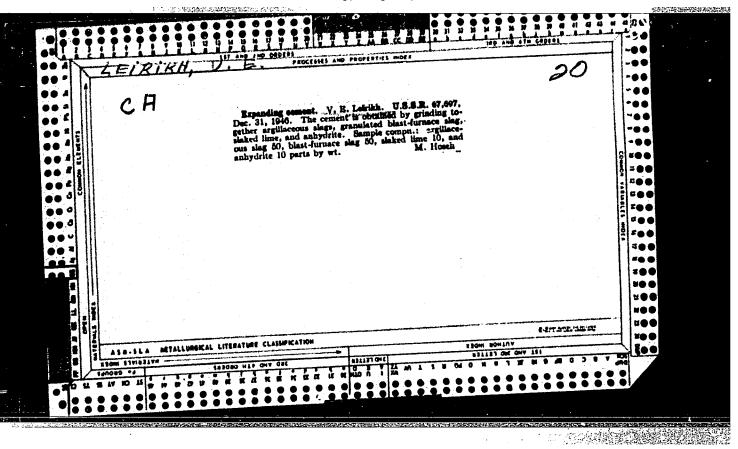
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LEYRIKH, A.A., inzh. IVANOV, I.A., kand. tekhn. nauk; BALAKHNIN, M.V., kand. tekhn. nauk; KROTOV, A.I., inzh.

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RAZRABOTKA I VNEDRENIYE PROMYSHLENNOY TEKHNOLOGII POLUCHENIYA TEPLOIZOLYATSION-NYKH BEZOBZHIGOVYKA DINATEMOVYKH MATERIALOV Page 111

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[Concrete for light petroleum products for nonmetallic reservoirs] Betony dlia nemetallicheskikh emkostei pod legkie nefteprodukty. Tema 39, no.1-56-54. Moskva, Akad. nauk SSSR, 1956. 23 p.

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LEYRIKH, V.R., kandidat tekhnicheskikh nauk; HIRONOV, S.A., professor, doktor tekhnicheskikh nauk, redaktor; MARTYNOVA, M.P., vedushchiy redaktor; POLOSINA, A.S., tekhnicheskiy redaktor

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[Making large silicate blocks with slotlike openings] Izgotovlenie krupnykh silikatnykh blokov so shchelevidnymi pustotami. Moskva, Otdel nauchno-tekhn.informatsii, 1957. 45 p. (MIRA 12:1) (Building blocks)

DESOV, A.Ye., doktor tekhn.nauk, prof.; DMITRIYEV, A.S., kand.tekhn.nauk;

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87435 5/191/60/000/010/009/017 B004/B060

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AUTHORS:

Leyrikh, V. E., Antonova, I. T., Savvina, Yu. A., Fiskina, R. Ya., Brodskiy, G. S.

TITLE:

Properties of Concrete With Furyl Aniline Resin Addition

PERIODICAL:

Plasticheskiye massy, 1960, No. 10, pp. 38-42

TEXT: This is a report on the improvement of concrete properties by the polymerization of furyl alcohol with aniline. Aniline is added as a hydrochloride. Furyl alcohol added to the cement suspension (20%), slows down the concrete structure formation; 5% CaCl are therefore added for

an accelerator. The addition of hydrochloride of aniline is varied, depending on the desired concrete properties, between 5 and 100%, referred to furyl alcohol. The resin is formed under liberation of heat. The liquid addition is calculated by the equations generally in use for ordinary concrete. The concrete prepared from different kinds of cement and aggregates with a furyl aniline resin content was tested for its technological properties. An M -116 (I-116) vibrator served for its

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Properties of Concrete With Furyl Aniline Resin Addition

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condensation. The following values of compressive strength were found for concrete with a ratio liquid: binding agent (cement plus microfiller) = 0.45: Portland cement of the Belgorodskiy zavod (Belgorod Factory) after 180 days 314 kg/cm²; Portland cement of type TH(BTTs) of the Nikolayevskiy zavod (Nikolayev Factory) after 180 days 370 kg/cm², under evaporation 376 kg/cm². The resistance to impact amounted after 90 days for BTTs cement to 5.0 kg. cm/cm³, for Belgorod cement 4.5 kg. cm/cm³; (30-35% more than in ordinary concrete). The coefficient of the bond between concrete and reinforcement ranged between 0.14 and 0.20 (as against 0.10 and 0.15 in ordinary concrete). The chemical stability was tested in Tuymazy petroleum, kerosene, gasoil, mineral oil, marine water, and ground water from Devonian horizons. All samples exhibited good stability over a 6-month testing time. A test for permeability to water (at 70 atm) and A -72 (A-72) gasoline (at 20-25 atm) showed that 6-cm thick concrete remained impermeable for 10-15 days. There are 4 figures and 2 tables.

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